MEMORANDUM **CH2MHILL**

Review of 90% Design - Slip 3 Containment Alteration/Boat Storage Re-Use
OMC Plant 2, Waukegan, Illinois
WA No. 018-RICO-0528, Contract No. EP-S5-06-01

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PROJECT NUMBER: 348138.PR.01

This memorandum summarizes our review of the "90% Design Submittal" (dated June 2007) drawings for constructing boat storage facilities at the Slip 3 site at Waukegan Harbor, Illinois. We also briefly reviewed the following accompanying documents to understand the project and the site conditions:

- Specification Section 02621, *Geocomposite Drainage Layer*
- Specification Section 02700, *Polyethylene Geomembrane Liner*
- A technical memorandum (TM) entitled *Waukegan Harbor Slip 3 - Field Sampling Results* (dated June 22, 2007)

The following comments address only the aspects of the proposed work as they relate to the containment of the PCB-impacted sediments. The review does not offer any opinion as to the adequacy of the foundation or structural design concepts.

General Comments

1. The basic concepts presented in the drawings appear to be reasonable, assuming that the characterization of the contamination provided in the TM is accurate. We have very few comments on the submittal; most relate to the need to provide details such that the new 60-mil HDPE lining - together with the other structural elements such as the grade beams - will provide a continuous primary containment barrier. Specifically, the drawings provide no detail regarding attachment of the HDPE lining to the various penetrations under the building (e.g., monitoring well, piling, etc.). It is unclear how the HDPE lining will act as a continuous primary containment without such connections.

2. The concept presented in the *Basis of Design Memorandum, Alteration of Slip No. 3 Containment Cell, Outboard Marine Corporation Superfund Site* dated November 20, 2006 discussed roof downspout drains. In a comment on that document, it was asked if the downspout drains would be able to reach the peripheral drainage system with

adequate cover and still not extend into the contaminated sediments. The present drawings do not address roof drainage. How will it be managed to prevent infiltration into the containment cell?

Specific Comments

1. **Sheet 4. Note 11.** This states that the topsoil and sand will be stockpiled at the City of Waukegan property location on Sheet 1. There is no proposed location identified on Sheet 1.

2. **Sheet 8.**

   a. The area under the building is shaded and noted to be the "60-MIL HDPE LINER." Presumably the remainder of the area enclosed within the slurry walls and the east sheet pile wall will also be provided with a 60-mil HDPE lining; the details on Sheet 13 imply this. This should be clarified.

   b. Is there any slope the HDPE liner under the building? Where will drainage from the geocomposite drainage layer be discharged?

3. **Sheet 10. Detail 3. Note 6.** This states that the HDPE liner under the interior floor slab is not welded to the grade beam. It should be to provide a continuous primary lining.

4. **Sheet 11. Detail 7.** The lowered Well Vault (R-1) is not called out on Sheet 6. Should this be Detail 8 (on Sheet 7)? In addition, the liner to well vault penetration detail (Detail 17 on Sheet 13) should be called out to show how the HDPE will be connected to the vault to provide a continuous primary lining.

5. **Sheet 11. Detail 9.** How is the HDPE connected to the steel casing to provide a continuous primary lining?

6. **Sheet 11. Detail 10.** It is not clear where this detail applies. If within the building, how is the HDPE connected to the concrete to provide a continuous primary lining?

7. **Sheet 12. Detail 13.**

   a. Special care will have to be taken to protect the HDPE liner from potential puncture damage where it crosses the slurry wall; the specifications should discuss removal of rocks or other objects as needed to protect the liner here.

   b. In Section B, provide a boot-type penetration for both conduits (or some other method to provide a continuous primary lining).

   c. In Section A and the plan view, the specifications should discuss how the 12-inch-diameter steel pipe is placed to minimize the potential for void formation in the slurry wall backfill. The seep collar is a good idea; the specifications should call for careful tamping of the backfill around the collar and beneath the pipe.

8. **Sheet 13. Detail 15.** The use of the Polylock strip is a convenient method to connect to the concrete, but has limited structural strength. Provision should be made to provide some amount of slack in the liner, or to otherwise accommodate potential differential settlement between the soil and the grade beam. The grade beams are pile-supported

and therefore unlikely to settle very much, while the fill is not pile-supported and may settle differentially relative to the grade beams.

9. **Sheet 13. Detail C.** HDPE is the least puncture-resistant of the commonly used geomembranes. A method to protect the HDPE liner from puncture where it is located above the protective concrete panels should be provided.